

Appl. No. 10/815,164
Response Dated October 18, 2006
Reply to Office Action of July 18, 2006

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••• REMARKS/ARGUMENTS •••

The Office Action of July 18, 2006 has been thoroughly studied. Accordingly, the following comments are believed to be sufficient to place the application into condition for allowance.

Claims 1-17 are pending in this application.

Claims 1-17 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,290,909 to Chen et al. in view of International Patent Publication No. WO 01/29136 to Nippon Mektron, Limited.

For the reasons set forth below, it is submitted that all of the pending claims are allowable over the prior art of record and therefore, the outstanding prior art rejection of the claims should properly be withdrawn.

Favorable reconsideration by the Examiner is earnestly solicited.

The Examiner has relied upon Chen et al. as disclosing:

...polyimide film compositions applied to metallic foil substrates comprising the reaction product of applicant's claimed components (B), (C), (D₁), and (D₂) (abstract; example 1). Examples show the applicant's claimed ratios of (C) to (D₁) or (D₂) (examples 1-2). The examples also teach the claimed method of applying a polyamic acid in a polar solvent, drying the film, and heating the film to form the polyimide. Flexible circuit boards are noted (col. 5 lines 17-25).

The Examiner concedes that Chen et al. fails to teach a mixture of dianhydride monomers.

The Examiner next relies upon Nippon Mektron as teaching:

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...copolyimides, where mixtures of dianhydrides are used. Component (A) is used with a second dianhydride similar to (B) and reacted with (C) to enhance solubility of the resulting polyimide (col. 2 lines 14-21; examples).

In combining the teachings of Chen et al. and Nippon Mektron, the Examiner takes the position that:

...it would have been prima facie obvious to combine components (B) and (A) in the applicant's claimed ratios to provide a finished polyimide film with enhanced solubility.

As discussed in the first paragraph under applicants' *Background Art* section:

Most of substrates for flexible printed circuit boards, etc. have been so far manufactured by bonding a metallic foil and an aromatic polyimide film with an adhesive such as epoxy resin, polyurethane resin, etc. However, the flexible printed circuit boards manufactured with such an adhesive have problems such as adhesive peeling due to successive thermal compression bonding hysteresis or due to exposure to elevated temperatures in the soldering step, or smear generation in the drilling step owing to an adhesive, and further have such drawbacks as curling, twisting, warping, etc. of the substrates after cooling, causing trouble particularly to form a fine pattern.

This prior art problem in which the etching process used for producing a wiring pattern from polyimide/copper foil laminates requires a solution that involves suppressing phenomena such as curling, twisting, warping etc. after the etching process.

Each of Chen et al. and Nippon Mektron include observations of curling effects (or flatness) of polyimide/copper foil laminates.

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However, the curing or flatness discussed in each of Chen et al. and Nippon Mektron is the curling or flatness of the laminates what have not yet been subjected to an etching process for forming wiring patterns thereon.

In this regard, nether Chen et al. nor Nippon Mektron mention an etching process and Chen et al. does not even mention wires or any wiring pattern.

Accordingly, it can be concluded that neither Chen et al. nor Nippon Mektron recognize the problem with phenomena such as curling, twisting, warping etc. that is caused by etching polyimide/copper foil laminates to form wiring patterns.

Moreover, neither Chen et al. nor Nippon Mektron recognize or appreciate applicants' manner of suppressing such phenomena that adversely affects substrates for flexible printed circuit boards.

The Examiner has specifically relied upon Chen et al. as teaching "applicant's claimed components (B), (C), (D₁), and (D₂)" which are:

3,3', 4,4' -biphenyltetracarboxylic acid dianhydride (B);

6-amino-2-(p-aminophenyl)- benzimidazole (C);

bis(4-aminophenyl) ether (D₁); and

phenylenediamine (D₂).

At column 5 Chen et al. teaches the use of BPDA, BIA, ODA and PDA.

These components were tested by applicants in a proportion similar to that taught by Chen et al. in applicants' Competitive Example 5.

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However, the laminate obtained in applicants' Comparative Example 5 showed undesirable curling phenomena after etching and subsequent heat treatment (the film was curled and shrank into a bar-like form) as seen in applicants' Table 3 on page 19 of applicants' specification.

It accordingly is clear that Chen et al. has no concern about the undesirable curling phenomena, and provides no solution to avoid such undesirable phenomena.

Nippon Mektron shares Jenq-Tain LIN as a common inventor of the present invention.

Nippon Mektron teaches the use of 3,3',4,4'-benzophenonetetracarboxylic acid dianhydride (B') as an example of a dianhydride.

The present inventors, including the common inventor, use 3,3',4,4'-biphenyltetracarboxylic acid dianhydride (B) and have determined that the use of (B) rather than (B') reduces water absorbability and further reduces the percentage of heat shrinkage of polyimide.

By using (B) rather than (B'), applicants discovered that the curing phenomena that normally occurs after the etching process was successfully suppressed.

Since neither Chen et al. nor Nippon Mektron discuss or recognize the problem with curling caused by etching and otherwise fail to collectively teach applicants' claimed composition, these reference taken alone or in combination do not render applicants' claimed invention obvious.

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It has long been held that in comparing the differences between the structure and properties taught in the prior art and those of applicants invention, it is necessary to include consideration of the problem solved by the inventor.

MPEP 2141.02 states that:

"[A] patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. This is part of the 'subject matter as a whole' which should always be considered in determining the obviousness of an invention under 35 U.S.C. w 103." *In re Spinnoble*, 405 F.2d 578, 585, 160 USPQ 237, 243 (CCPA 1969).

In the present situation it is clear that the prior art, i.e., Chen et al. and Nippon Mektron do not recognize the problem which applicants alone have recognized, addressed and solved.

Accordingly, as to Chen et al. and Nippon Mektron, applicants invention is patentable for recognizing a problem that Chen et al. and Nippon Mektron have not discovered.

Moreover, applicants solution to the problem is not at all taught, suggested or in any way obvious over the prior art.

Accordingly, it is submitted that applicants' invention is patentable over Chen et al. and Nippon Mektron for the reasons set forth above.

Based upon the above distinctions between the prior art relied upon by the Examiner and the present invention, and the overall teachings of prior art, properly considered as a whole, it is respectfully submitted that the Examiner cannot rely upon the prior art as required under 35 U.S.C. §103 to establish a *prima facie* case of obviousness of applicants' claimed invention.

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It is, therefore, submitted that any reliance upon prior art would be improper inasmuch as the prior art does not remotely anticipate, teach, suggest or render obvious the present invention.

It is submitted that the claims, as now amended, and the discussion contained herein clearly show that the claimed invention is novel and neither anticipated nor obvious over the teachings of the prior art and the outstanding rejection of the claims should hence be withdrawn.

Therefore, reconsideration and withdrawal of the outstanding rejection of the claims and an early allowance of the claims is believed to be in order.

It is believed that the above represents a complete response to the Official Action and reconsideration is requested.

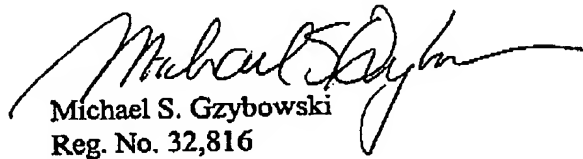
If upon consideration of the above, the Examiner should feel that there remain outstanding issues in the present application that could be resolved; the Examiner is invited to contact applicants' patent counsel at the telephone number given below to discuss such issues.

To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge the fees due in connection with the filing of this paper, including extension of

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time fees, to Deposit Account No. 12-2136 and please credit any excess fees to such deposit account.

Respectfully submitted,


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